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<a href="#">Images</a>		<a href="#">Documents</a>	
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**Paulsboro Train Derailment**  
 Paulsboro, NJ - EPA Region II  
 POLREP #17  
 SPECIAL #3: Last VCM Tank Car Retrieved

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U.S. ENVIRONMENTAL PROTECTION AGENCY  
 POLLUTION/SITUATION REPORT  
 Paulsboro Train Derailment - Removal Polrep



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 Region II

**Subject:** POLREP #17  
 SPECIAL #3: Last VCM Tank Car Retrieved  
 Paulsboro Train Derailment

Paulsboro, NJ  
 Latitude: 39.8345751 Longitude: -75.2368212

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**From:** Dwayne Harrington, OSC  
 Paul L. Kahn, OSC

**Date:** 12/16/2012

**Reporting Period:**

**1. Introduction**

**1.1 Background**

<b>Site Number:</b>	A22R	<b>Contract Number:</b>	
<b>D.O. Number:</b>		<b>Action Memo Date:</b>	
<b>Response Authority:</b>	CERCLA	<b>Response Type:</b>	Emergency
<b>Response Lead:</b>	PRP	<b>Incident Category:</b>	Removal Action
<b>NPL Status:</b>	Non NPL	<b>Operable Unit:</b>	
<b>Mobilization Date:</b>	11/30/2012	<b>Start Date:</b>	11/30/2012
<b>Demob Date:</b>		<b>Completion Date:</b>	
<b>CERCLIS ID:</b>	NJN000206653	<b>RCRIS ID:</b>	
<b>ERNS No.:</b>		<b>State Notification:</b>	
<b>FPN#:</b>		<b>Reimbursable Account #:</b>	

**1.1.1 Incident Category**

Transportation Related - Conrail train car derailment

**1.1.2 Site Description**

**1.1.2.1 Location**

At approximately 0700 EST on 30 November 2012, Thirteen Conrail freight cars transporting chemicals and other goods derailed and overturned at a bridge crossing the Mantua Creek in Paulsboro, New Jersey. The incident occurred near the 200 block of East Jefferson Street. The Department of Transportation reported three cars fell into the creek. Conrail reported one of the tank cars released approximately 180,000 pounds of vinyl chloride into Mantua Creek. Onlookers also reported seeing a vapor cloud rise from the scene.

Mantua Creek is a stream in Mantua Township in Gloucester County. It flows northwest for 18.6 miles to the Delaware River at Paulsboro across from the Philadelphia International Airport. The FAA reports airport operations were unaffected. Mantua Creek is approximately 150 feet wide at the location of the bridge collapse. The incident occurred approximately 1.4 miles upstream of the outlet into the Delaware River.

The NTSB has been on scene since 1400 hours on 30 November 2012 conducting their investigation.

#### **1.1.2.2 Description of Threat**

USCG, NJDEP, EPA and Gloucester County Emergency Response, including HAZMAT, responded to the incident. Gloucester County Emergency Response initially ordered residents to shelter-in-place. A half-mile radius evacuation zone was also issued for local residents. Paulsboro High School was placed on lockdown at 0715 EST. The school was later dismissed. The Transportation Security Operation Center reported that 18 residents reported possible effects from the spill and were placed in a staging area for decontamination.

Vinyl chloride is an industrial chemical described as a colorless gas with a sweet odor and known to be highly toxic, flammable and carcinogenic. It is primarily used in the production of PVC. According to the Environmental Protection Agency, short-term exposure to high levels of vinyl chloride in the air has resulted in central nervous system effects such as dizziness, drowsiness and headaches.

Two VCM cars were directly involved in the accident. One car was pierced and off-gassed approx. three quarters of the 22,000 gallons of VCM. Self-refrigeration froze the remaining VCM inside the car. An oil sheen was observed and is attributed to hydraulic fluid from the bridge entering the creek. Hard and soft boom was deployed on the creek by private contractor.

#### **1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results**

On November 30, 2012, EPA initiated air monitoring with the TAGA unit based in Edison, NJ. Preliminary results for VCM revealed ambient levels up to 1.3 ppm using actual GCMS.

## **2. Current Activities**

### **2.1 Operations Section**

#### **2.1.1 Narrative**

#### **2.1.2 Response Actions to Date**

Refer to POLREPs 1 thru 10 for previous response actions.

#### **DECEMBER 4, 2012**

During this operational period, air monitoring operations continued with nine AreaRAEs providing real-time VOC results through the Viper System. In addition, two mobile RST teams equipped with PIDs are roving the neighborhood and responding to readings observed on the AreaRAEs. The ERT TAGA bus continued to perform real-time analytical, focusing on the perimeter of the evacuation zone and responding to validate PID readings.

Due to the observation of VOCs beyond the perimeter of the evacuation area intermittently over the past two nights, Incident Command expanded the evacuation area one block to the north and to the west impacting approximately 100 additional homes. The shelter-in-place order remains in effect for the town.

As of 0700 hours 12/4, VOC levels varied from 0 ppm to 10 ppm at the AreaRAE closest to the wreck. This is attributable to the change in atmospheric conditions as the sun rose and began to warm the land. By 0845 VOC levels declined to 0 ppm and have remained at that level as of 1500 hours.

From 1630 to 2100 hours on 12/4, AreaRAEs recorded two VOC exceedances of the 1.0 ppm action limit set by incident command. At one location inside the evacuation zone and situated the closest to the incident, an exceedance was recorded which lasted 11 minutes and peaked at 3.4 ppm (corrected). Another exceedance was recorded which lasted 17 minutes and peaked at 11.0 ppm (corrected). At a second location, outside the evacuation zone along Mantua Creek, an exceedance was recorded which lasted for 26 minutes and peaked at 5.8 ppm (corrected). Recurring brief VOC exceedances have been observed at this location which is one half mile NNW of the accident. ERT has been tasked to collect a 24hr air sample from this location to quantify the potential for exposure over a 24 hour period. RST teams monitored this area through the night. No additional exceedances were observed. Additional 24 hr air samples will be co-located with selected AreaRAEs during the next operational period.

From 2100 hours on 12/4 to 0600 hours on 12/5, zero VOC detections were observed by the AreaRAEs or RST mobile teams. The ERT TAGA bus completed a run through the town, focusing on the perimeter of the evacuation zone at approximately 2200 hours. No quantifiable concentrations of VCM were detected. Another run was initiated at 0530 hours on 12/5 as residents prepare to leave for work. RST teams only detected VOCs at one location during the 1900-0700 shift. A concentration of 2.4 ppm (corrected) was detected at the Crown Point Rd Bridge at approximately 0500 hours. Winds were steady throughout the night significantly improving the air monitoring results.

Conrail's plans for acetone flushing of the remaining VCM from the ruptured tank car have been approved by Unified Command and preparations were made through the night for operations to begin on December 5.

Transfer operations have been complicated by the fact that the only location in which to access the remaining product is through the opening created by impact with a second tank car. The second tank car came to rest in the impact position, thus obstructing the opening. The initial transfer was accomplished by feeding a two inch tube into the car and using suction created by six railcars under vacuum to remove the product, while introducing nitrogen into the railcar to reduce ignition risks. This operation was effective, however, due to the wreckage limiting access to the opening, the position of the suction tube could not be optimized to completely empty the tank. Approximately 500-700 gallons of product remained.

The current operation will be completed by adding acetone from a truck into the ruptured tank of VCM. The VCM and acetone are miscible and thus the acetone will act as a carrier for the VCM. Unlike water, the introduction of acetone will not trigger rapid evolution of vapor. The resulting increased volume in the car will allow for transfer back into the truck in a manner similar to the first operation. Primary vapor control will be accomplished by drawing vapors from inside the tank using six tank cars which have been placed under vacuum. If needed, a secondary vapor control system will be in place in which a vacuum truck filled with diesel fuel will be utilized to draw vapors from the ruptured car. The recovered vapors will be pulled through the fuel as a primary scrubber and the vacuum-truck exhaust will be polished by activated carbon filters treated with potassium permanganate. At the conclusion of the primary transfer, approximately 500-700 gallons of acetone/VCM mixture will remain. A separate, smaller, suction set-up has been fabricated to reach the remaining product. Following the removal of liquid product, purging the car of vapors will continue using vacuum tank cars and/or scrubber system.

#### **DECEMBER 5, 2012**

During this operational period Conrail initiated pumping at 12:30 hours and continued all day. Throughout the day there were no readings above 0 ppm until 16:45 hours when there was a 2 ppm VOC spike on Crown Point road. The TAGA lab was deployed to the location to confirm the reading and the levels were measured at 0.0 ppm. Periodic spikes in VOC readings are expected as the weather changes and individuals work on and in the tank car.

Product transfer operations were completed at approximately 2300 hours. Following the completion of the product transfer. Conrail commenced flushing/purging remaining fumes and product in the tank car using steam and nitrogen. This process continued through the night until a non-explosive atmosphere was achieved.

EPA OSC Kish attended an 'open house' organized by Incident Command at the Nehaunsey Middle School in Gibbstown, NJ. In addition, the EPA-ERT TAGA lab and staff attended. EPA was able to discuss air monitoring concerns/questions from attendees.

EPA reviewed AreaRAE results from 1600-2100 hours in Viper. No excursions above the 1.0 ppm VC action level were observed. One brief detection of 0.1 ppm was observed which was not sustained. RST mobile teams continued air monitoring while the TAGA bus continued air monitoring as well. From 2100 to 0700 one AreaRAE located on Mantua Avenue recorded a detection lasting approximately 5 minutes that peaked at 0.4 ppm, corrected to VC. A second AreaRAE location situated at the high school registered detections of 0.2 ppm VOC.

#### **DECEMBER 6, 2012**

OSC Kahn reports for duty at 0700 hours. No VOC readings above 0.0 ppm noted. NJDEP has initiated contractor-conducted, house-by-house air screenings by request of residents. The contractor is CTEH, brought in by Conrail for the overall response. As of 0900 hours only one resident has requested screening.

#### **DECEMBER 7, 2012**

Vinyl Chloride Monomer (VCM) tank car pumping, steaming, and nitrogen purging complete - no VCM or LEL readings were obtained inside the VCM tank car.

No VCM readings at EPA fixed stations or mobile air teams for this period. If no VCM air readings are recorded for the previous 24-hr period - ending on 1100 hrs Friday 11/7 - Conrail's consultants and contractors will review all air data obtained to date and present to UC a plan for displaced residents to re-occupy the evacuated residential areas.

Accident site preparation for removal of remaining rail cars - removal of bridge pilings and debris in river, track preparation, etc - is scheduled to begin on Friday, 12/07/12, and is expected to be completed by Saturday, 12/08/12, after which removal of railcars will commence.

ERT commenced deploying SUMMA canisters to the nine (9) locations where the AreaRAEs are deployed. The SUMMAs will sample for 24 hours and will be analyzed in the EPA ERT REAC labs in Edison, NJ. Results are anticipated within 24 hours after the samples reach the lab. The first round of SUMMA canisters were deployed during a rain event, so a second round of SUMMA sampling will be conducted after the first group of samples are collected, providing two concurrent 24-hour sampling events.

The web site for Unified Command is up and operational. See Links section of this POLREP for the address.

At 1115 hours today UC informed EPA OSC, through the NJDEP (Env. Unit) that the TAGA lab would be needed on a continuous basis for the duration of the response. Consequently, the TAGA unit presently deployed to the scene will remain on-scene until Monday, 12/10. Some time on the 10th a second TAGA unit from Edison will meet with the first unit in Placebo and switch-out units. The unit leaving the scene will return to Edison for required maintenance and the replacing TAGA unit will remain on-scene for the duration of the response.

As of 12 noon today the VOC readings are all 0.0 ppm.

EPA OSC and PAD attended a press conference hosted by NJ Sen. Menendez and USCG COPT (IC).

1530 hours the VOC readings are all 0.0 ppm.

EPA Region 2 PAD provided with unprocessed air monitoring results compiled in conjunction with ERT.

#### **December 8, 2012**

All air monitoring results 0.0 for this period. SUMMA canisters deployed at fixed air monitoring stations for 24 hr composite sample collection.

All air monitoring results 0.0 for this period. SUMMA canisters deployed at fixed air monitoring stations for 24 hr composite sample collection.

Second non-haz railcar (lumber) removed; site prep and debris clearing ongoing. Removal of chemical railcars cars tentatively scheduled to begin on Sunday 12/09/12.

UC lifted the residential evacuation and is coordinating home re-entry (started yesterday 11/07/12). Residents re-enter their homes escorted by law enforcement personnel and a hazmat technician (Conrail contractor, CTEH) who monitor for VOCs and Vinyl Chloride Monomer (VCM). As of 1900 hrs, on Friday, 12/07/12, out of approximately 204 homes evacuated, 183 homes have been reoccupied (160 homes cleared, 23 declined air monitoring). It is anticipated that all homes will be re-entered by 1100 hrs Saturday 12/08/12.

1130 hours OSC and DEP access wreck site to obtain updated information on status of wreck site. 1200 hours the two de-railed cars that remained on land were up-righted and removed from the scene. Crane barge is on-station near the bridge and is clearing obstacles from the area. OSC updates OSC.net with new photos.

EPA provided CTEH (contractor for Conrail) with a Google Earth map showing the locations of the Viper AreaRAE monitoring locations.

As of 1600 hours all air monitoring results show 0 ppm for VOCs

#### **December 9, 2012**

All air readings 0 ppm for this period. All air readings 0 ppm overnight. All residents have returned to their homes. Bridge pilings being removed for barge access to for tank car removal.

Conrail is developing a plan for tank car removal to present to UC for review and approval; no projected schedule to begin tank car removal at this time.

As of 0730 hours the RST teams and the TAGA lab are deployed to scene to conduct air monitoring.

At 1130 hours TAGA unit reports getting a VCM reading of 2 PPB, lower than the detection limit of the GC-MS instrument, so this is considered to be a false positive. TAGA unit stayed on station for an additional 30 minutes and did not detect any VCM.

#### **Night Operations:**

All air monitoring readings 0 ppm for this period.

No night operations at the derailment site for this period. RP is preparing a tank car rigging and safety plan to present to UC for review and approval prior to commencing tank car removal operations.

Additional residences outside of the evacuation area have been monitored and cleared for VCM at the request of the residents To date, 280

#### **December 10, 2012**

EPA continues to provide air monitoring in support of the NJDEP during this operational period. Two START contractor teams conducted community air monitoring using Multi-RAEs to supplement the 8 AreaRAE fixed monitoring stations being maintained. All air monitoring readings were 0 ppm for VOCs throughout the day.

The EPA ERT TAGA also continues to monitor for VCM in the neighborhoods; all results were below detectable levels for the period.

The following response operations were conducted by the UC/PRP today:  
A contract diver was used to rig and assist in the removal of the bridge's A-frame support structure from the Mantua Creek.

Two barges were put in place to be used as platforms as needed during the railcar removal operation.

Repair work was conducted on the rail/tracks on the southern end of the bridge.

NOAA conducted acoustic Doppler tide measurements at the bridge in order to determine the exact timing of high and low slack tides. Exact timing is necessary for the safety of the dive operations being planned to perform assessment and rigging operations for railcar removal. These dive operations can only be performed during slack tide.

Railcar removal is planned to begin tomorrow morning. The first car to be removed will be the empty, breached VCM car. It is expected that the four railcars can be removed at a rate of one per day. The removal rate is being dictated by several constraints including:

The tide cycles – the barge cranes can only be moved during high tide. The divers can only operate during slack tides.

- Pedestrian traffic – It is currently being planned that railcar removal will not be conducted when students are en route to and from school. Additional no railcar removal activities are being planned during weekends when pedestrian traffic near the site would be at a high.

Public information session planned for tomorrow evening.

Rigging next car to be removed VC (stabilized w/ N2)

#### **Night Operations:**

- All air monitoring readings 0 ppm for this period.
- No night operations at the derailment site for this period.

280 residences and 23 business have been monitored and cleared for VCM, 47 residences declined monitoring, and 1 residential monitoring pending scheduling with homeowner.

#### **December 11, 2012**

TAGA and RST report 0 ppm readings all day.

1635 hours Conrail lifts the empty VCM car from the water and places it on the ground. 1700 hours OSC left CP for public meeting at Paulsboro high school.

#### **Night Operations:**

EPA OSCs, PAD, and ERT attended a public meeting hosted by UC. Heavy turnout Citizens primary concerns' were about the initial handling of the response and ongoing communications about current and future operations. No direct questions for EPA.

All air readings 0 ppm for this period

Empty VCM railcar removed during the day; no night operations during this period.

The original tank car removal schedule is being revised due to removal obstacles and tidal influences at the site; removal operations will most likely extend into next week.

#### **December 12, 2012**

TAGA and RST continue roving air monitoring. Zero PPM readings documented. Viper network records 0 ppm on all 9 monitors. SUMMA canisters deployed for 3rd 'round of air sampling, UC has decided to commence night time crane/rigging Ops effective this date. Crews will rig the tank cars during the night but lifting the cars will be accomplished during daylight hours. Consequently, the TAGA mobile lab will remain deployed at the scene on a 24/7 basis to perform both routine and on-demand air monitoring.

Crews continue to remove debris and metal obstructions from damaged RR bridge to allow crane barge to snug-up to tank cars.

Throughout the afternoon VOC readings remain at 0 ppm. EPA provided DEP with all VOC and VCM data and air monitoring results from 11/30 to 12/9.

EPA provided DEP with air monitoring results from the TAGA lab from 11/30 to 12/9.

#### **Night Operations:**

All air readings 0 ppm for this period

Site prep work continues for removal of next two VCM tank cars

CDC has mobilized to the response to assist NJDOH in assessing the public health impact of the incident

Divers were unable to sling the next VCM tank car. This will prevent any lifting from occurring during daylight hours on 12/13.

#### **December 13, 2012**

DEP reports that last night divers were unable to sling the next VCM car for lifting today. This activity is somewhat limited to the two slack tides when flow through the Mantua Creek is slowest. Consequently, it is unlikely that the VCM car will be extricated today.

RST and ERT-TAGA lab continue to conduct roving air monitoring in and around Paulsboro.

#### **Night Operations**

All air readings 0 ppm for this period

No night operations at derailment site for his period

#### **DECEMBER 14, 2012**

POLREP #14 issued. Conrail was successful in rigging the VCM car that is sitting vertically in the creek. Plan for the day is to re-rail the VCM car that only jumped the tracks on the far side of the creek and move that car and the VCM 'anchor' car out of the way. After that the plan is to extricate the vertical VCM car. UC is requiring all subordinate groups to submit demobe plans.

US provided EPA with an ICS-209 Incident Summary which indicates that the daily burn rate for costs is

approx. \$900,000. This is the "spend rate" and does not include lost RR cargo revenue.

At approximately 1315 hours the intact VCM tank car was successfully removed from the Mantua Creek and staged on the work barge. VOC air monitoring results were 0 ppm before, during, and after the lift.

#### **Night Operations**

**All air readings 0 ppm for this period**

**Dive operations continue to inspect bridge subsurface**

**Bridge and track repair operations continue**

Bridge and track repair operations continue

Crane barge repositioned for extraction of ethanol tank car

#### **December 15, 2012**

POLREP #15 issued. Late yesterday afternoon the VCM car that was being used to anchor the derailed VCM car was re-railed, as was the other VCM car 98041. Both cars were connected to a locomotive and removed from the scene.

Plan to lift the ethanol car (207398) with the crane has been revised. Due to the construction of the tank car Conrail decided it was too risky to lift the car with the crane and instead has opted to use two 'Sidewinder' heavy lift bull dozers with special provisions to life derailed cars. In connection with this activity, Conrail has deployed the Neptune deluge system (12") and a portable aerator system. These devices will be used to disperse and aerate the ethanol should there be a catastrophic release to the creek.

Plan to raise ethanol car changed again. Crane will lift car out of the creek and hand it off to the Sidewinders for re-railing. As of 0930 hour divers are rigging the lifting apparatus under the ethanol car.

1000 hours the ethanol car is removed from the water. VOC air monitoring reports 0 ppm readings.

1330 hours the ethanol car is re-railed and removed from the wreck scene. The remaining VCM car is partially rigged for extraction.

1600 hours the VCM car is fully rigged for lifting.

OSC sends EU Leader a draft demobe plan for Air Monitoring activities. Demobe plan for Air Monitoring will be forwarded to UC for consideration.

#### **Night Operations**

**All air readings 0 ppm for this period**

**Dive operations for debris removal continue; rail and bridge repair in preparation for final rail car removal continue.**

#### **December 16, 2012**

OSC Kahn reports for duty at 0710 hours. At 0720 hours the last VCM car was removed from the creek and staged on the work barge. Conrail continues working on repaing the tracks and bridge. Three VCM cars are currently staged on the work barge. Air monitoring results from overnight and into the morning were 0.0 ppm on all hand-held monitors, AreaRAEs and TAGA lab.

TAGA lab demobed effective at 1200 hours. RST ht time roving air monitoring team has been cancelled. RST daytime team will demobe at 1200 hours today. The Viper AreaRAEs and SUMMA canisters will remain active until approx. 0800 hours on 12/17/2012. CTEH, the contractor for Conrail, will maintain its air monitoring activities until all RR cars have cleared the area.

RST and TAGA personnel and assets depart the area at 1200 hours.

OSC demobes and departs the Command Post at 1300 hours.

#### **2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)**

**One PRP is Consolidated Rail Corporation (Conrail)**

#### **2.1.4 Progress Metrics**

<i>Waste Stream</i>	<i>Medium</i>	<i>Quantity</i>	<i>Manifest #</i>	<i>Treatment</i>	<i>Disposal</i>

**2.2 Planning Section****2.2.1 Anticipated Activities****2.2.1.1 Planned Response Activities**

EPA will continue to support the air monitoring efforts as requested by DEP.

**2.2.1.2 Next Steps**

- Continue air monitoring and sampling with hand-helds, Viper system and TAGA lab.

Following the completion of the VCM transfer, the next steps will include the following:

- Use barge cranes to remove debris and lift HazMat rail cars from the creek.

- Removal of all damaged rail cars.

**2.2.2 Issues****2.3 Logistics Section**

No information available at this time.

**2.4 Finance Section**

No information available at this time.

**2.5 Other Command Staff**

No information available at this time.

**3. Participating Entities**

No information available at this time.

**4. Personnel On Site**

No information available at this time.

**5. Definition of Terms**

No information available at this time.

**6. Additional sources of information**

No information available at this time.

**7. Situational Reference Materials**

No information available at this time.

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